

REQUEST FOR RECONSIDERATION

Claims 15 – 25 are active.

The claimed invention provides a process for preparing an aqueous polyurethane dispersion, according to Claim 15, wherein at least one polyfunctional isocyanate having 4 to 30 carbon atoms is reacted with at least one diol in the presence of N-ethyl-pyrrolidone or N-cyclohexylpyrrolidone.

Applicants have described the advantages of the claimed invention as follows:

The inventive preparation of the polyurethanes in the presence of N-(cyclo)alkylpyrrolidones leads to at least one of the following advantages:

- Reduced solvent requirement.
- The dispersions are easier to apply by spraying or through nozzles, since encrustation or contamination on spraying tools is reduced.
- Lower toxicity than, for example, N-methylpyrrolidone.
- The prepolymer solutions have a lower viscosity.
- The rheology of the polyurethane dispersions is improved.
- The wetting behavior of substrates or additives is improved.
- Lower yellowing under light and/or heat exposure.
- Greater frost resistance of the dispersions.
- Improved flexibility, particularly lower-temperature flexibility, of the resultant films.
- Higher gloss of the resultant films.

Whereas the subsequent addition of N-alkylpyrrolidones, as known from the prior art, serves merely to adjust physical parameters of the finished dispersion, the inventive preparation of polyurethanes in the presence of N-(cyclo)alkylpyrrolidones leads to advantages associated with the preparation of the polyurethanes, which would not be possible to achieve by subsequent addition. One possible reason for this might be that the polyurethanes prepared inventively absorb the N-(cyclo)alkylpyrrolidone by swelling, for example, over the whole of the cross section, whereas in the case of subsequent addition only superficial absorption, at best, can take place.

Applicants submitted the attached declaration by Dr. Karl Häberle, an inventor of record in the above-identified application with an Amendment on July 7, 2008. In his declaration, Dr. Häberle describes preparing polyurethane dispersions of the same

components, differing only that the comparative example was reacted in N-methylpyrrolidone, whereas Examples 1 and 2, according to the invention, were reacted in N-ethylpyrrolidone and N-cyclohexylpyrrolidone, respectively. Coatings prepared from the respective dispersions were then evaluated for steam resistance, with the results shown, as follows:

Example	Evaluation of Steam Resistance
Comparative	(2) film is severely discolored
Example 1	(0) film shows no change
Example 2	(0) film shows no change

Applicants submit that the improvement in steam resistance is significant and demonstrates a useful performance advantage in coating applications such as described on page 16, lines 13-19, in the specification.

The rejection of Claims 15-22 and 24-25 under 35 U.S.C. 103(a) over Pears et al. (WO 99/50362) as evidenced by Argabright (U.S. 3,526,655) is respectfully traversed.

Pears describes a method to prepare colored polyurethanes and inkjet inks containing the colored polyurethanes. The polyurethanes are prepared by i) reaction of an organic polyisocyanate and at least one isocyanate reactive compound having water-dispersing groups. In a second step, a chromophoric molecule having a group reactive to a chain terminal functionality is reacted with the polyurethane chain and terminates the chain (page 1, lines 23-30). Pears describes water-miscible solvents suitable for lowering the viscosity of the polymerization step i) on page 4, lines 29-32. The list includes N-methylpyrrolidone, dimethyl sulphoxide, a dialkyl ether of a glycol acetate and methyl ethyl ketone.

Pears further describes that once the water dissipatable polyurethane is prepared, it is isolated and placed in a liquid medium suitable for preparation of an ink-jet ink. The ink

solvent medium may be aqueous or non-aqueous and a list of suitable solvents presented on page 7, lines 16-34, includes N-methyl-pyrrolidone and N-ethyl-pyrrolidone.

As previously argued, Applicants submit that one of ordinary skill recognizes that the two lists are not interchangeable. The list on page 7 includes alcohols which would compete for reaction with the polyisocyanate group during the polymerization stage i).

The Office now acknowledges that Pears does not indicate that the polyisocyanate is made in N-ethyl-pyrrolidone (Official Action dated May 12, 2011, page 4, lines 5-6) and alleges obviousness based on homology.

The Office has cited MPEP 2144.09 with respect to homology. However, as described above, Applicants have provided evidence of superior steam resistance is obtained according to the invention. The homologous relationship noted by the Office would not lead one of ordinary skill in the art to expect such difference in performance and therefore the results provided by Dr. Häberle are clearly unexpected.

A *prima facie* case of obviousness based on structural similarity is rebuttable by proof that the claimed compounds possess unexpectedly advantageous or superior properties. *In re Papesch*, 315 F.2d 381, 137 USPQ 43 (CCPA 1963)

Applicants again submit that Argabright describes a reaction of a metal cyanate and an alkyl halide to form an isocyanate and as such technology is not related to the synthesis of polyurethane polymers, the secondary reference is unrelated and if applied, would support the unexpected nature of the results provided in Dr. Häberle's declaration.

Applicants submit that the *prima facie* case of obviousness over the cited reference combination is rebutted by the showing of unexpected superior performance described above. Accordingly, Applicants respectfully request that the rejection of Claims 15-22 and 24-25 under 35 U.S.C. 103(a) over Pears as evidenced by Argabright be withdrawn.

Application No. 10/591,662
Reply to Office Action of May 12, 2011

The rejection of Claim 23 under 35 U.S.C. 103(a) over Pears as evidenced by Argabright in view of Bruchmann et al. (DE 10161156: US 2005/0043467 as English equivalent) is respectfully traversed.

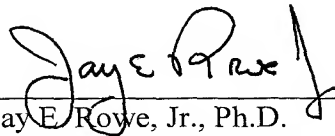
Applicants note that Claim 23 depends from Claim 15 and includes all the description of the independent claim. The *prima facie* case of obviousness over the primary reference combination is rebutted above. Bruchmann describes an aqueous dispersion of a water dispersible polyurethane and a process for preparing the aqueous dispersion involving reacting the monomers in the presence of a cesium salt. However, Bruchmann does not disclose or suggest the addition of N-ethyl- or N-cyclohexylpyrrolidone to the preparation of a polymer mixture as according to the present invention and therefore, can not disclose or suggest the superior performance obtained according to the present invention.

In view of all the above, Applicants respectfully request that the rejection of Claim 23 under 35 U.S.C. 103(a) over Pears as evidenced by Argabright in view of Bruchmann be withdrawn.

Applicants respectfully submit that the above-identified application is now in condition for allowance and early notice of such action is earnestly solicited.

Respectfully submitted,

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